Space Weather Forecast

Issued on Thursday, 22 December 2022 at 13:21 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate-class X-ray flares and slight chance Minor Geomagnetic Storms.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low, with occasional Common Class flares. There are currently 7 sunspot regions on the front facing disc, with a departing sunspot being replaced by a new development in the northeast. The largest flares came from a complex elongated region(s) in the northeast. Another large spot is approaching the southwest limb and is becoming increasingly difficult to discern. A region in the southwest showed an increase in complexity with a couple of small spots developing ahead of a mature spot. All other regions remain small and simple.

No Earth directed Coronal Mass Ejections (CMEs) were observed in the available imagery during the period. A CME which left the northeast of the Sun early on the 21st December has be re-analysed and is now thought to miss to the east of Earth rather than causing a glancing blow.

Solar Wind / Geomagnetic Activity: The solar wind rose from slow levels to become slightly elevated by 21/1425 UTC. It peaked at 434 km/s before gradually decreasing back to below 400 km/s. The strength of the magnetic field was initially moderate but declined to weak levels from 21/1530 UTC. Generally the north-south component was unremarkable with only weak fluctuations but a slightly stronger period of southward direction was briefly observed early in the period. The solar wind parameters possibly suggest a weak positive coronal hole fast wind influence. Resultant geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: The count rate of observed energetic particles (high energy protons) remained at background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to remain Low, with occasional Common-class flares. There remains a consistent chance of Moderate flares and slight chance of a Strong X-ray flare throughout the forecast period as departing spots are anticipated to be replaced by new regions from the far side.

Solar Wind / Geomagnetic Activity: No CMEs currently feature in the forecast. Solar winds are forecast to be slightly elevated to elevated through the period due to the combination of coronal hole fast wind events. Quiet to Unsettled geomagnetic activity is most likely, with spells of Active. There is a slight chance of G1 Minor Storms throughout.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to persist at background levels with no solar radiation storms occurring. However, there is a slight chance of the count rate increasing with any notable flares, potentially reaching the S1/Minor Radiation Storm level.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	20	20	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	30	30	30
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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